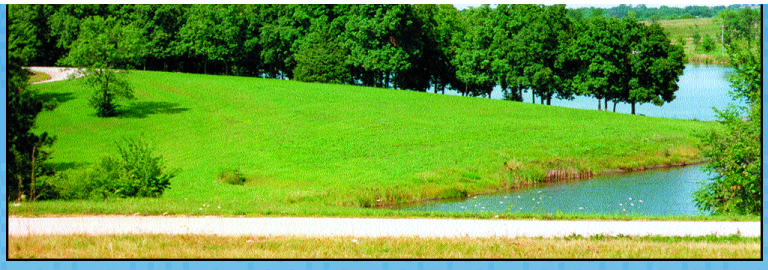
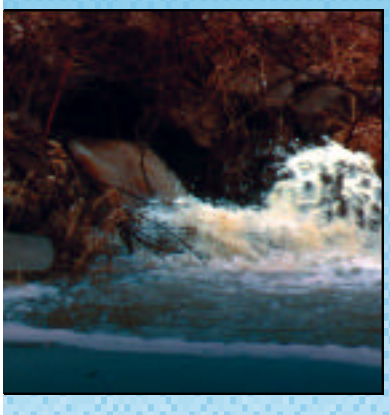


The Lake Fisher Water Quality Project



The scenery could be described as pastoral. The rolling hills that rise and fall in and around Bloomfield offer a beautiful, diversified landscape for its residents combining a mixture of woodlands, pastures and cropland. It is home. And Lake Fisher, of course, has been the aesthetic and recreational centerpiece of the land around Bloomfield for more than six decades. People fish here, often sharing the lake's aquatic bounty with bald eagles and other raptors. They picnic here. The road around the lake is a beautiful walk or drive, allowing an opportunity for area citizens to enjoy the splendor of Iowa's four seasons.

The Story of Lake Fisher

Ironically, Lake Fisher wasn't built to be beautiful. When the 100-acre reservoir was constructed in 1936 as a Works Progress Administration (WPA) Project, it was done for purely functional purposes as a water supply to local residents. Today, that reservoir has the capacity to hold 326 million gallons of water to supply 3,100 area residents.

"I don't think people appreciate what we have here," says area resident Bob Boatman who can remember when the dam creating the reservoir was constructed by hand. "Lake Fisher has been a boon to this community from the time it was built. Now we're trying to address things that we didn't even know were problems 40 years ago," Boatman said.

Prior to Lake Fisher, Boatman said the city drilled a series of deep and shallow wells along Fox Creek to supply residents with water.

"The water was so hard coming from the wells that area doctors used to come here and bottle it to prescribe as a laxative," said Joe Willard who has been the superintendent of Bloomfield's Water Treatment Plant for 38 years. But the Lake Fisher of today isn't what it used to be. One need look no further than the southwest leg of the lake for the evidence.

Originally 12 to 15 feet deep, the southwest leg is now only three to five feet because of the soil erosion from the lake's watershed. This portion of the lake has silted so that it can no longer handle drainage from the land above it. During heavy precipitation, the southwestern portion of the lake fills until water goes over the road, closing South Lake Fisher Drive.

The sedimentation causes even bigger headaches for people like Willard charged with the responsibility of providing a clean water source to area residents. Willard said it is becoming more challenging to treat the public water supply for pesticides and fertilizers washing into Lake Fisher from the surrounding watershed.

"We are trying to strike a balance between improving the water quality of the untreated water and still maintain the lake for recreational purposes," Willard said.

The good news is that many problems in the watershed can be addressed. Public awareness and the use of best management practices (BMPs) can yield immediate rewards. The work planned in Lake Fisher's watershed will not only improve water quality in the short-term, but also serve as an example to future generations of how we can live more in harmony with the environment. n

What is a watershed?

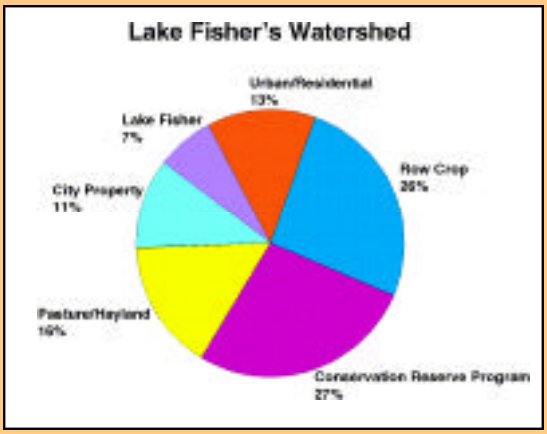
All of the land on earth is divided into watersheds. We all live in one. A watershed is an area of land that water drains through on its way to the lowest point — a lake, a river or a stream. Watersheds come in all shapes and sizes. Just to our east, for example, the Mississippi River is one of the largest watersheds in the world with water draining from approximately 1.2 million square miles flowing into its banks.

Lake Fisher, on the other hand, has a watershed of 1,380 acres — or a little more than two square miles — just a fraction of the size of the Mighty Mississippi.

But protecting Lake Fisher's watershed is no less important to residents here. More than 3,000 people depend on Lake Fisher daily for one of life's most essential elements — water.

The quality of water in a lake, river or stream depends on conditions within the watershed. This fact becomes even more important in the case of Lake Fisher when we stop to think that we eventually have to drink that water. When the quality of the water flowing into Lake Fisher is degraded by excessive sediment, more expensive methods for treatment are required to make it safe to drink.

As rain falls, the water either travels over the surface or seeps into the ground. Water that travels over the surface may pick up contaminants like sediment, chemicals and waste that eventually end up in Lake Fisher.



But the good news is that improvements can be made to the watershed to reduce the amount of contaminants entering Lake Fisher and improve the quality of water. Practices like those described in this publication offer real solutions to protecting the watershed and ensuring our generations will have clean water from Lake Fisher. n

The Project

Imagine over 200, 10-ton dump trucks full of dirt dumping their loads one-by-one into the waters of Lake Fisher. Such a convoy lined up end-to-end would be approximately a mile long.

Unfortunately, this is almost exactly what happens year after year in Lake Fisher, except that it is water, not trucks, carrying the dirt which becomes sediment on the bottom of the lake.

The water draining from 1,380 acres of land in Lake Fisher's watershed deposits an estimated 2,100 tons of sediment each year into the reservoir. Often attached to the particles of dirt are pesticides and nutrients that can degrade the quality of water in the lake. Water quality is also hampered by the presence of bacteria from private sewage disposal systems that simply don't work as well

as intended because of the soil characteristics found in the watershed.

One of the most important things to remember is that people have to drink the water from Lake Fisher. What washes into the lake will require extensive treatment before it can flow through the faucets of the homes, the schools and the businesses of Bloomfield and the surrounding area. More than 3,100 people around Lake Fisher rely on the reservoir for their source of water each day, as do the visitors for events like the Davis County fair, stock car races, sporting events and the annual music festival.

The Lake Fisher project is about the people of the area working together to find solutions for problems in the watershed. The project is a partnership that provides governmental funding and assistance to local farmers, landowners and residents wanting to improve the quality of their drinking water supply, now and in the future.

Focusing attention on improving the quality of the water running in from the watershed will provide Lake Fisher with a good dose of "preventative maintenance," according to Richard Wilcox, public works director of Bloomfield.

"If we can prevent contaminants from entering Lake Fisher, than obviously, we don't have to treat those contaminants," Wilcox said.

"If we can focus more attention on what is coming down the watershed to Lake Fisher, it will increase our ability to provide the purest, safest drinking water possible. The end result is also lower costs to the public if we don't have to spend as much money for treatment," Wilcox said.

By the end of the project, it is intended to have a clear measure of how successful the effort has been to positively impact the quality of Lake Fisher's water.

Over the course of the next three years, people in the watershed will have the opportunity to access more than $280,000 in Water Protection Fund moneys through the Iowa Department of Agriculture and Land Stewardship. This will fund structural improvements to their property on a cost-share basis designed to reduce the amount of sediment flowing into the lake. The City of Bloomfield will contribute about $60,000 for rip rap to stabilize the shoreline of the lake. Approximately $60,000 will also be provided through the federal Environmental Protection Agency to hire a coordinator, Tom Sperfslage, for the project. n

Improvements that will be done to protect Lake Fisher's watershed include:

n Treating over 900 acres of agricultural land with a combination of terraces, water and sediment control basins, ponds and constructed wetlands with a goal of reducing the amount of sediment reaching Lake Fisher by 60 percent. Reducing the sediment load will significantly improve water quality, reduce the cost of treating water for excessive sediment and extend the life span of the lake.

n Reducing the amount of nutrients, pesticides and organic materials flowing into the lake by 50 percent. A concentrated effort will be made to provide information and educational programs for farmers and homeowners in the watershed. There will also be demonstration projects using best management practices on agricultural land that will not only heighten public awareness of water quality in the watershed, but throughout Davis County.

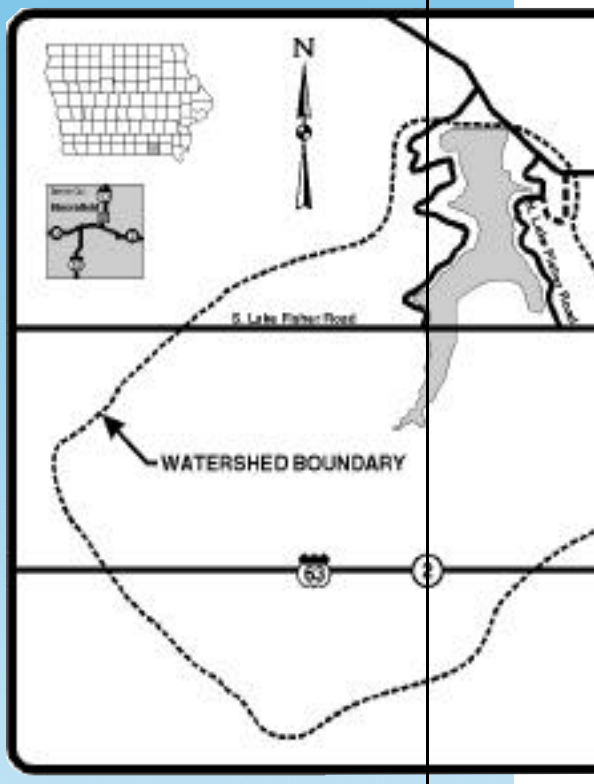
n Reducing the amount of bacteria being delivered to the lake by 50 percent through the demonstration of alternative sewage disposal systems. Soils in the watershed do not allow conventional septic systems to function properly. The project will develop at least five demonstration projects through cooperation with private home owners utilizing alternative systems which will work more efficiently with the local soil types. n

Land Management: The Key to I

Since non-point source pollution can be attributed to various land disturbances, specific methods have been developed to minimize both these disturbances and the runoff they generate. These methods are known as BMPs or best management practices.

Synonymous with prevention, BMPs use the land in the wisest possible ways — whether it be for growing crops or grazing cattle, building highways or growing trees. BMPs are exactly what the phrase implies: coordinated, judicious timing of activities and use of vegetation and materials (including some structures) as components within a total land management system.

The accompanying map shows the area of Lake Fisher's watershed. The BMPs that will be used to improve water quality are also highlighted on these two pages.



Grassed waterways

Rainfall that flows from fields often concentrates into small streams of water that erodes soil and forms gullies if the land is bare. Waterways are shaped and seeded with grass in areas of concentrated flow. The grass slows the water and guides it off the field, significantly reducing gully erosion. The Lake Fisher project will establish 18 acres of grassed waterways.

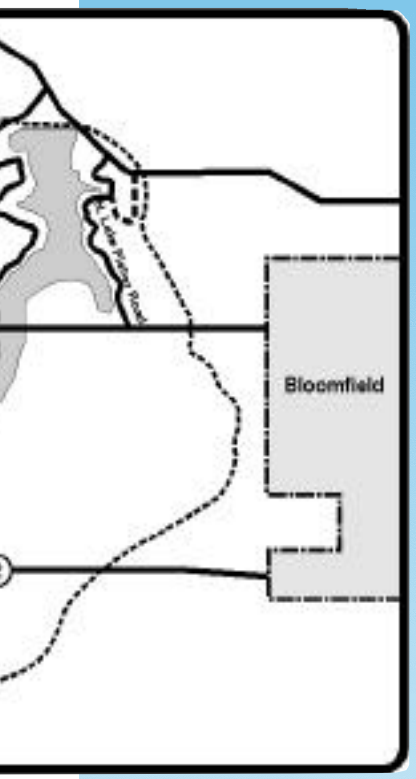
Septics

Because of the tight types of soils in the Lake Fisher watershed, the use of conventional septic systems for rural residences is not always effective. As a result, these septic systems have limited effectiveness and are potential sources of bacterial contamination for the lake. At least five alternative household wastewater systems designed to work effectively in the soils of the Lake Fisher watershed will be installed as demonstration projects.

Streambank stabilization

Eroding lake shorelines add sediment to waters such as Lake Fisher. The banks can be shaped and seeded with protective grasses or protected with rock rip rap, willow trees and other stabilizing measures. The Lake Fisher project will add approximately 6,000 feet of rip rap along areas of critical shoreline erosion. Vegetation, primarily in the form of short varieties of grasses, will be used along the Lake Fisher shoreline in places where shoreline erosion is less critical.

mproving Lake Fisher

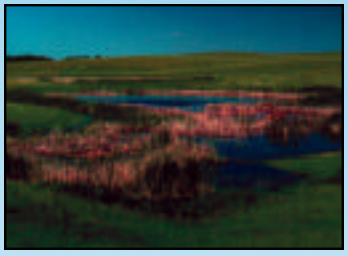


Terraces

Terraces are grass-covered earthen ridges built on a hillside slope to catch run-off water and deliver it to an underground tile outlet at the bottom of the hill. The tile carries the run-off water to a non-eroding outlet. A total of 34,300 feet of terraces are planned for construction during the Lake Fisher project.

Wetlands

Wetlands are essentially areas of shallow water forming a zone of transition between land and deep water. These areas are not continuously dry land but also may not be continuously wet depending on the season or the amount of precipitation. Because of the multifaceted merger of soils and water, a standardized definition of wetlands is difficult. What we do know is that wetlands have a remarkable ability to receive, hold and recycle nutrients, making them extremely efficient and cost effective for treatment of domestic, agricultural and industrial wastewaters and runoff. Wetlands also provide excellent wildlife habitat including nesting cover for a variety of waterfowl and songbird species. The Lake Fisher project will utilize wetland construction for two primary purposes — as a filter for agricultural runoff and as an alternative waste collection system for private septic systems at two demonstration sites.



Water and sediment control basins

Basins function similarly to a small dam or terrace to prevent gully erosion. They are embankments built across drainageways or depressional areas where water concentrates to run off a field. Basins store water temporarily and deliver it to underground tile. Three of these structures are planned for the Lake Fisher project.

Well plugging

Wells were designed to bring groundwater up to the surface. Unfortunately, those same structures can take contaminants down into groundwater when no longer in use. Left unplugged, abandoned wells can become direct conduits for pollution from the surface to flow directly into groundwater supplies. Abandoned wells are plugged using sealing materials such as bentonite (naturally occurring clay composed of minerals which cause the material to swell when wet), cement and concrete. The Davis County Health Department has agreed to give Lake Fisher top priority in the allocation of abandoned well closure funds. Meetings will be held with producers and rural land owners to identify and close 10 abandoned wells in the Lake Fisher watershed.

Photos courtesy of: USDA Natural Resources Conservation Service

Lake Fisher's Recreation Qualities

Children of the Bloomfield area have played along the shores of Lake Fisher for more than six decades. The reservoir provides more than drinking water to area residents. It has also been an important recreational asset to the community.

Lake Fisher still stands as the state benchmark for largemouth bass as a result of this record, 10-pound, four-ounce whopper landed by Patricia Zaerr of Davenport in the spring of 1984.

It may be small in size, but Lake Fisher has a gigantic-sized reputation among anglers as home to one of Iowa's most coveted state records — a 10-pound, 4-ounce largemouth bass caught in the spring of 1984. Even today, Lake Fisher stands as testimony that big fish can come from small waters.

"There are some days when I can look out of the window at the water treatment plant and see cars with license plates from Jasper or Linn or Polk County. That state record being on the books for so long has probably brought people from that far away to try it here," said Tom Howk, assistant superintendent at the Bloomfield Water Treatment Plant.

Is there another state record lurking the waters of Lake Fisher? Possibly. The state record fish measured 23 1/2 inches in length. A survey of Lake Fisher conducted by the Iowa Department of Natural Resources in the summer of 1997 showed a fair population for largemouth bass in the 17- to 20-inch range as well as fair numbers in the 11- to 15-inch class, according to Mark Fleming, a fisheries management biologist for the DNR. "Lake Fisher is a pretty decent fishery for a lake that is so small. It is known to produce some quality size fish," Fleming said.

Lake Fisher hosts two bass tournaments each year on the Memorial Day and Labor Day weekends, typically drawing approximately 40 anglers.

"We've had teams from as far away as Des Moines and Mason City participate as well as a lot of local interest over the years," said Ted Henderson, director of the Bloomfield Parks and Recreation Department.

Catfish, the number-one species sought by Iowa anglers, also offer an important fishing opportunity at Lake Fisher. Stocked each year with 7-inch fingerlings, the size of catfish is "all over the board," Fleming said.

"I would guess that about any size of catfish you would care to catch is in Lake Fisher," Fleming said.

And Lake Fisher's value as a recreational asset to the local community certainly isn't limited to hook, line and sinker. Lake Fisher has two shelterhouses for picnickers and family reunions. A softball diamond will be home to a local fast-pitch team this summer as well as a planned slow pitch league.

The 2.6 mile road circling the lake has hosted high school cross country competitions through the years. That same stretch of road is used even more frequently by the health conscious, yet less competitive at heart, as a daily exercise walk.

Lake Fisher's two shelterhouses play host to a number of events throughout the year — everything from family reunions to fishing derbys and clinics like the one shown above.

Lake Fisher's Project Goals

The primary goal of the Lake Fisher Project is to improve the quality of Lake Fisher for the more than 3,100 people who rely on it for drinking water. To accomplish this goal, three objectives have been identified:

- Reducing by 60 percent the amount of sediment entering Lake Fisher from the more than 900 acres of agricultural lands in the watershed.
- Eliminating shoreline erosion around the lake by adding 6,000 feet of rip rap.
- Reducing the amount of nutrients, pesticides and organic materials that enter the lake by 50 percent.
- Reducing the amount of bacteria entering the lake from livestock waste and private sewage disposal systems by 50 percent.

Bloomfield's Director of Public Works Richard Wilcox, left, and Parks and Recreation Director Ted Henderson at a tile outlet that washes tons of sediment into Lake Fisher each year.

This tile outlet into Lake Fisher drains approximately 125 acres of land and the sediment carried by the water can be seen in the brown coloration of the fluid. Improvements in the watershed will reduce the amount of sediment flowing into the lake.

Without proper management, severe gully erosion like this can occur. The Lake Fisher project will work with area producers to control erosion in the watershed. Proper management of the soil will not only result in less sediment flowing in Lake Fisher, but also help protect the fertility of farm land in the watershed.

What is nonpoint source pollution?

Non-point source pollutants are those contaminants swept into water bodies by heavy rains or carried into groundwater. Non-point source pollutants cannot be traced to a specific source.

A variety of land uses may contribute to this elusive contamination — chemical application to cropland, residential lawns or golf courses, soils disturbed by new construction, manure runoff from a livestock operation and soil eroding from cropland are just a few.

Sediment is Iowa's biggest environmental threat to water quality. Sediment not only fills in thousands of cubic feet in Iowa's lakes, rivers and streams annually, but also destroys fish habitat and decreases recreational use. n

Lake Fisher's Partners

The Lake Fisher Project has a strong coalition behind it. Members of the coalition joining forces to improve the lake's water quality are: the Davis County Board of Supervisors, the Davis County Department of Health, the City of Bloomfield, the Davis County Conservation Board, the Iowa State Cooperative Extension Service; the local chapter of Pheasants Forever, the USDA Natural Resources Conservation Service, the Iowa Department of Natural Resources, the Division of Soil Conservation of the Iowa Department of Agriculture and Land Stewardship, and the US Environmental Protection Agency. n

Tentative Schedule for the Lake Fisher Project

Activity	Completion Date
Survey, design and install: • 25,000 feet of terraces • two water and sediment control basins • small constructed wetland Place rip-rap along shoreline Install and demonstrate five alternative private sewage systems Public meeting on first-year results including survey of public attitudes toward water quality	First year
Survey, design and install: • 9,400 feet of terraces • one water and sediment control basin • one wetland • 18 acres of grassed waterways • one animal waste holding pond Close 10 abandoned wells and hold field day Public meeting on second year results including survey of public attitudes toward water quality	Second year
Project final report	Third year

The publication of this document has been funded by the Iowa Department of Natural Resources through a grant from the U.S. Environmental Protection Agency under the Federal Nonpoint Source Management Program (Section 319 of the Clean Water Act).

For more information on the Lake Fisher project, contact:

AGENCY	CONTACT PERSON	TELEPHONE NUMBER
Davis County Soil and Water Conservation District and Natural Resources Conservation Service	Tom Sperfslage, coordinator and Fred Hainline, District Conservationist	(515)664-2600
City of Bloomfield	Richard Wilcox, Director of Public Works and Ted Henderson, Parks and Recreation Department Director	(515)664-2260
Bloomfield Water Plant	Joe Willard, Superintendent	(515)664-1317
Davis County Health Department	Donnie Herteen, Environmental Health Specialist	(515)664-3629
Davis County Conservation Board	Rick Krenz, Director	(515)664-2572
Davis County Extension Service	Roger Musselman, Director	(515)664-2730

To receive additional copies of this publication, contact: Iowa Department of Natural Resources, 900 East Grand, Des Moines, IA50319-0034 or call (515) 281-5973.
Produced by Kevin Baskins, Iowa Department of Natural Resources. Spring 1998.